

DETAILED ACTION

1. Claims 1-2, 4-8, 10-14, 16-19 & 21-22 are pending in the application.
2. Claims 3, 9, 15 & 20 have been canceled.

EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Robert T. Clarke on 11/20/2009.

The Claims have been amended as follows:

- **Replace Claim 1 with:**

A communicating apparatus which makes spreading by multiplying transmission data by a chaos spreading code and transmits a spreading output, the communicating apparatus comprising:

a first and second spreading units; and

a transmitting unit to which output signals of said first and second spreading units are inputted;

wherein a first chaos spreading code which is inputted to said first spreading unit and a second chaos spreading code which is inputted to said second spreading unit orthogonally cross each other, wherein an absolute value of a

Art Unit: 2611

normalized correlation coefficient of said first and second chaos spreading codes is equal to or less than 0.3; and

further wherein said first and second chaos spreading codes are formed by a chaos spreading code generator comprising:

a storing unit in which an initial value is set;

a mapping unit for executing mapping once in which a map according to a Chebyshev's polynomial has been applied to the value that is outputted from said storing unit or for divisionally executing said mapping a plurality of number of times;

randomizing means for randomizing a least significant bit of an output of said mapping unit; and

a path for outputting the output of said mapping unit including said randomized least significant bit, as said chaos spreading code, and returning said output to said storing unit, and said initial value is made different between said first and second chaos spreading codes.

- **Cancel Claim 3.**
- **Replace Claim 7 with:**

A communicating method which makes spreading by multiplying transmission data by a chaos spreading code and transmits a spreading output, the communicating method comprising:

spreading the transmission data by first and second chaos spreading codes, respectively, and forming first and second spreading outputs; and

Art Unit: 2611

transmitting said first and second spreading outputs;

wherein said first chaos spreading code and said second chaos spreading code orthogonally cross each other, wherein an absolute value of a normalized correlation coefficient of said first and second chaos spreading codes is equal to or less than 0.3; and

wherein said first and second chaos spreading codes are formed by a chaos spreading code generating method comprising:

setting an initial value into a storing unit;

executing mapping once in which a map according to a Chebyshev's polynomial has been applied to the value that is outputted from said storing unit or divisionally executing said mapping a plurality of number of times;

randomizing a least significant bit of a mapping output; and

outputting the mapping output including said randomized least significant bit, as said chaos spreading code, and returning said output to said storing unit, and said initial value is made different between said first and second chaos spreading codes.

- **Cancel Claim 9.**
- **Replace Claim 13 with:**

A communicating apparatus for receiving transmission data constructed by first and second spreading outputs which have been spread by first and second chaos spreading codes, in which said first and second chaos spreading codes orthogonally cross each other, wherein an absolute value of a normalized

Art Unit: 2611

correlation coefficient of said first and second chaos spreading codes is equal to or less than 0.3, the communicating apparatus comprising:

a receiving unit for receiving said first and second spreading outputs;

first and second inverse spreading units for inversely spreading said first and second spreading outputs received by said receiving unit by said first and second chaos spreading codes, respectively; and

synchronizing means for synchronizing said first and second chaos spreading codes with a transmitting side;

wherein said first and second chaos spreading codes are formed by a chaos spreading code generator comprising:

a storing unit in which an initial value is set;

a mapping unit for executing mapping once in which a map according to a Chebyshev's polynomial has been applied to the value that is outputted from said storing unit or for divisionally executing said mapping a plurality of number of times;

randomizing means for randomizing a least significant bit of an output of said mapping unit; and

a path for outputting the output of said mapping unit including said randomized least significant bit, as said chaos spreading code, and returning said output to said storing unit, and said initial value is made different between said first and second chaos spreading codes.

- **Cancel Claim 15.**

- **Replace Claim 18 with:**

A communicating method of receiving transmission data constructed by first and second spreading outputs which have been spread by first and second chaos spreading codes, in which said first and second chaos spreading codes orthogonally cross each other, wherein an absolute value of a normalized correlation coefficient of said first and second chaos spreading codes is equal to or less than 0.3, the communicating method comprising:

- a receiving step of receiving said first and second spreading outputs;

- first and second inverse spreading steps of inversely spreading said first and second spreading outputs received by said receiving unit by said first and second chaos spreading codes, respectively; and

- a synchronizing step of synchronizing said first and second chaos spreading codes with a transmitting side;

wherein said first and second chaos spreading codes are formed by a chaos spreading code generating method comprising:

- setting an initial value into a storing unit;

- executing mapping once in which a map according to a Chebyshev's polynomial has been applied to the value that is outputted from said storing unit or divisionally executing said mapping a plurality of number of times;

- randomizing a least significant bit of a mapping output; and

- outputting the mapping output including said randomized least significant bit, as said chaos spreading code, and returning said output to said storing unit, and

Art Unit: 2611

said initial value is made different between said first and second chaos spreading codes.

- **Cancel Claim 20.**

Allowable Subject Matter

4. Claims 1-2, 4-8, 10-14, 16-19 & 21-22 and re-numbered as claims 1-to-18 respectively are allowed.

5. Claims 1-2, 4-8, 10-14, 16-19 & 21-22 and re-numbered as claims 1-to-18 respectively are allowable over the prior art of record because the cited references do not contain the specified limitation of a:

A communicating apparatus which makes spreading by multiplying transmission data by a chaos spreading code and transmits a spreading output, the communicating apparatus comprising:

a first and second spreading units; and

a transmitting unit to which output signals of said first and second spreading units are inputted;

wherein a first chaos spreading code which is inputted to said first spreading unit and a second chaos spreading code which is inputted to said second spreading unit orthogonally cross each other, wherein an absolute value of a normalized correlation coefficient of said first and second chaos spreading codes is equal to or less than 0.3; and

further wherein said first and second chaos spreading codes are formed by a chaos spreading code generator comprising:

Art Unit: 2611

a storing unit in which an initial value is set;

a mapping unit for executing mapping once in which a map according to a Chebyshev's polynomial has been applied to the value that is outputted from said storing unit or for divisionally executing said mapping a plurality of number of times;

randomizing means for randomizing a least significant bit of an output of said mapping unit; and

a path for outputting the output of said mapping unit including said randomized least significant bit, as said chaos spreading code, and returning said output to said storing unit, and said initial value is made different between said first and second chaos spreading codes.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUDHANSHU C. PATHAK whose telephone number is (571)272-5509. The examiner can normally be reached on 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on 571-272-3042.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sudhanshu C Pathak/
Primary Examiner, Art Unit 2611